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Technical Proposal X 111

HRT-2 Beacon Transmitter Production

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INTRODUCTION:

[] is pleased to submit a proposal to build production quantities of the HRT-2 beacon transmitter. This transmitter is a rugged, highly reliable, weatherproofed transistorized transmitter operating in the medium frequency range. The customer's urgent requirements call for an extremely tight schedule. In order to accomplish the delivery dates required, [] will use the most efficient and most skilled manpower available to insure that reliability will not be sacrificed to gain time.

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GENERAL DESCRIPTION:

The unit [] proposes to build is being built currently on Task 28. The unit is housed in a gray case measuring under 15 x 4 x 9 inches overall. A self-contained battery pack is inserted by removing the end of the case with an attached screwdriver. The bottom plate, which also serves as a mounting base for the transmitter, is removable for circuit accessibility. A 16 foot collapsible whip antenna is mounted on the case. A grounding rod is provided, attached with ground braid to the case. Control knobs are provided for oscillator and final output tuning. A meter measures r-f current into the antenna and indicates peak tuning. The meter is illuminated by a red pilot light which may be covered for night-time operation. The light also serves as a battery voltage indicator by not lighting at a supply voltage lower than the battery end point voltage. The bulb is lit with relatively constant intensity from 9 to 20 volts supply voltage. Binding posts are provided for connection of external antennas. A power connector/shorting plug enables the use of an external supply and at the same time prevents connection of any external supply across the internal battery. An on-off switch is provided with a switch guard to prevent accidental turn on of

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the transmitter during handling. The necessity for a fuse is eliminated by use of a transistor current limiter which limits fault currents to under 3 amperes and also protect against incorrect polarity on any external supply.

Extensive gasketing and sealing weatherproofs the unit. Construction techniques are employed which make the unit highly resistant to damage by vibration and shock. Electrical design is such that the unit will operate under a wide range of temperature condition.

TRANSMITTER DESIGN GOALS:

Since the units are still being finalized on Task 28, the following are presented as design goals rather than final specifications.

Frequency Range: 1500 to 1800 kc

Frequency Stability: Crystal controlled within ± 100 cps over a temperature range of -40°C to $+70^{\circ}\text{C}$, reference at 25°C .

Supply Voltage: Nominal 15 volts $\pm 40\%$. Self-contained battery supply consisting of 12 Mallory RM42R mercury cells in series, Mallory type 303247, 20.2v. Any external supply capable of 9 to 21 volts dc at up to 3 amps.

Power Output: Greater than 10 watts at nominal supply voltage into a 50 ohm load. Unit shall be capable of feeding loads of from 10 to 250 ohms with series reactance variations of $\pm j$ 600 ohms with less than 3 db of degradation from specification.

Carrier Identification: A tone of 1000 to 2000 cps shall interrupt the carrier with modulation for 5 seconds out of 15 seconds. A jumper shall be provided to supply continuous tone modulation when desired.

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Operating Temperature: -40° to $+70^{\circ}\text{C}$ with less than 3db change in output power (circuit only)

Size: Overall dimensions 15 x 9 x 4 inches

Weight: 17 lbs. including batteries

Humidity: The transmitter will operate after storage for 4 hours in 100% humidity at 45°C .

Vibration: Resonant frequencies shall be determined by slowly varying the frequency of the applied vibration through a frequency range of 10-55 cps at an applied double amplitude of .060 inches. Individual resonant frequency surveys shall be conducted along each of three mutually perpendicular axis. If any resonance is noted, the equipment shall be vibrated at that frequency for 30 minutes. When more than one resonance is encountered with vibration applied along any one axis, the test period may be divided among the resonant frequencies or may be accomplished at the most severe resonance, whichever is most likely to produce failure. When clearly defined resonances are not noted within the frequency range specified, the unit shall be vibrated for one hour along each of its mutually perpendicular axis at .060 DA and automatically cycling at approximately one minute intervals from 10 cps to 55 cps to 10 cps. At the conclusion of these tests the equipment shall meet specifications.

Drop Test: Unit shall be operable after six drops from 3 feet to a concrete floor. The unit shall be dropped once on each face.

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RELIABILITY TESTING:**SECRET**

In addition to designing a unit with components running at well below their ratings, takes many precautions to insure that only reliable units are shipped. Starting with the incoming inspection of components where all parts are checked against our specifications, the program consists of testing at various phases of production to insure reliability. Units are inspected after assembly for any faulty connections, improper lead dressing or poor workmanship. After assembly and alignment the working units are shaken on a paper jogger in various planes to remove any loose particles or show up any faulty connections. The units are then temperature shocked to further show up any cold solder joints. The units are placed in a cold box at -40°C and allowed to stabilize for at least 4 hours. They are then quickly moved to a hot box at $+70^{\circ}\text{C}$ and allowed to stabilize for 4 hours. The units are then brought down to room temperature and are checked for proper operation. At the successful completion of these tests the units are placed on continuous burn-in for at least 48 hours. After burn-in they are final tested. Those units passing the final test are ready for shipment.

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DELIVERY SCHEDULE:**SECRET**

<u>Delivery</u>	<u>Quantity</u>	<u>Description</u>	<u>Delivery Date</u>
1.	10	HRT-2 Beacon Transmitters	January 1, 1961
		and Accessories	
	20	Battery Packs	
2.	50	HRT-2's and Accessories	January 15, 1961
	100	Battery Packs	
3.	100	HRT-2's and Accessories	January 30, 1961
	200	Battery Packs	

This schedule is contingent upon the contract resulting from this proposal being authorized on or before November 1, 1961. If the contract is authorized after November 1, 1961, delivery 1 shall occur 60 days after authorization, delivery 2 shall occur 75 days after authorization and delivery 3 shall occur 90 days after authorization.

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